

## **REMARKS**

This Response is submitted in reply to the Office Action dated August 7, 2007. claims 1 to 6, 8 to 13, 15 to 20, and 24 to 30 have been amended. No new matter has been added by these amendments. claims 22, 23, 32 and 33 have been cancelled without prejudice or disclaimer.

A Petition for a Two-Month Extension of Time is submitted herewith. Please charge deposit account number 02-1818 for the Two-Month Extension of Time and any other fees due in connection with this Response.

### **I. Specification**

The Office Action objected to the disclosure suggesting that, on page 3, line 3 of the specification, the phrase, "control the operation of" should be "move." Applicant respectfully disagrees. Applicant respectfully submits that the motion unit 116 can in fact control the operation of the robot. The specification states, "the motion unit 116 can be for example, wheels, tracks, legs or any element to control the operation of the robot 100." Specification, paragraph [0013]. One of ordinary skill in the art would recognize that the motion unit 116, which can be for example, wheels, tracks, legs, or any other element, could be operable to control, directly or indirectly, the operation of the robot 100.

The Office Action also objected to the disclosure, noting that the last sentence in the second paragraph of page 4 of the specification is repeated. Applicant has amended the specification to overcome such objection.

Accordingly, Applicant respectfully requests withdrawal of the objections to the specification.

### **II. Claim Objections**

Claim 24 is objected to for lacking antecedent basis for "the infrared sensor" and "the robot." Applicant respectfully submits that this objection is rendered moot in view of the amendment to claim 24. Accordingly, Applicant respectfully requests withdrawal of the objection to claim 24.

### **III. Amended Independent Claims**

Claims 1, 8, 15, and 24 are the sole independent claims. Each of claims 1, 8, 15 and 24 has been amended for the reasons detailed below.

Amended independent claim 1 recites, in part, "an infrared sensor operatively coupled to the memory device, the infrared sensor including: (a) an infrared light source configured to produce a plurality of pulses of infrared light directed toward an environment of the robot; (b) at least one optic configured to focus a plurality of reflections of the infrared light pulses from the environment of the robot to the array of detectors; and at least one processor operatively coupled to the memory device, the processor operable to determine distance information based at least in part on the determined time value."

Similarly amended independent claim 15 recites, in part, "producing a plurality of pulses of infrared light directed toward an environment of the robot; focusing with at least one optic a plurality of reflections of the infrared light pulses from the environment of the robot to an array of detectors; and processing the determined time value to determine distance information based at least in part on the determined time value."

Amended independent claim 8 recites, in part, "an infrared light source operatively coupled to the memory device and configured to produce a plurality of pulses of infrared light directed toward an environment of the robot an infrared light source operatively coupled to the memory device and configured to produce a plurality of pulses of infrared light directed toward an environment of the robot; at least one optic operatively coupled to the memory device and configured to focus a plurality of reflections of the infrared light pulses from the environment of the robot to the array of detectors; and at least one processor operatively coupled to the memory device, the processor operable to determine distance information based at least in part on the determined time value; at least one optic operatively coupled to the memory device and configured to focus a plurality of reflections of the infrared light pulses from the environment of the robot to the array of detectors; and at least one processor

operatively coupled to the memory device, the processor operable to determine distance information based at least in part on the determined time value."

Similarly, amended independent claim 24 recites, in part, "producing a plurality of pulses of infrared light directed toward an environment of the robot; focusing with at least one optic a plurality of reflections of the infrared light pulses from the environment of the robot to an array of detectors; and processing the determined time value to determine distance information based at least in part on the determined time value."

#### **IV. Rejection – Double Patenting**

The Office Action rejected claims 15 and 24 on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 3 of U.S. Patent No. 6,604,022 to Parker et al. ("*Parker*"). Applicant respectfully submits that this rejection has been overcome for the reasons set forth below.

The Office Action states:

Although the conflicting claims are not identical, they are not patentably distinct from each other because the elements of the presented claims include the elements of the patented invention. Office Action, pg. 3.

Applicant submits that this rejection is rendered moot because amended independent claims 15 and 24 include elements that are missing from claim 3 of *Parker*. Specifically, in contrast to claim 3 of *Parker*, amended independent claim 15 recites, in part, "an array of detectors; a memory device storing data corresponding to at least one counter configured to determine a time value; . . . at least one optic operatively coupled to the memory device and configured to focus a plurality of reflections of the infrared light pulses from the environment of the robot to the array of detectors, and at least one processor operatively coupled to the memory device, the processor operable to determine distance information based at least in part on the determined time value."

Similarly, in contrast to claim 3 of *Parker*, amended independent claim 24 recites, in part, "storing data in a memory device of a robot, the memory device corresponding to at least one counter configured to determine a time value; producing a plurality of pulses of infrared light directed toward an environment of the robot; focusing with at

least one optic a plurality of reflections of the infrared light pulses from the environment of the robot to an array of detectors; and processing the determined time value to determine distance information based at least in part on the determined time value."

For at least this reason, Applicant respectfully requests that the rejection of claims 15 and 24 on the ground of nonstatutory obviousness type double patenting over claim 3 of *Parker* be withdrawn.

#### **V. Rejections – 35 U.S.C. § 102 and § 103**

The Office Action rejected claims 15, 19, 24 and 29 under 35 U.S.C. §102(e) as being anticipated by U.S. Patent No. 6,594,844 to Jones ("*Jones*"). Applicant respectfully traverses this rejection for at least the following reasons.

Applicant submits that *Jones* does not disclose each and every element of amended independent claims 15 and 24. Specifically, *Jones* does not disclose at least: (a) an array of detectors; and (b) at least one optic operatively coupled to the memory device and configured to focus a plurality of reflections of the infrared light pulses from the environment of the robot to the array of detectors.

Accordingly, Applicant respectfully submits that amended independent claims 15 and 24 and dependent claims 16 to 21 and 25 to 31 are patentably distinguished over *Jones*.

The Office Action rejected claims 15, 16, 18, 20 to 22, 24 to 26, 28, 30 to 32 under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 6,338,013 to Ruffner ("*Ruffner*"). The Office Action rejected claims 1 to 4, 6 to 11, 13 to 14, 17, 23, 27 and 33 under 35 U.S.C. §103(a) as being unpatentable over *Ruffner* in view of U.S. Patent No. 6,480,265 to Maimon et al. ("*Maimon*"). Applicant respectfully traverses such rejections for at least the following reasons.

The Office Action acknowledges that *Ruffner* does not disclose a robot that includes an array of detectors and optics to focus a plurality of reflections of the infrared light pulses from the environment of the robot to the array of detectors. See, Office Action, pg. 11. The Office Action relies on *Maimon* for such disclosure. See, Office Action, pg. 11. Because amended independent claims 1 and 15 each include an array

of detectors and at least one optic to focus a plurality of reflections of the infrared light pulses from the environment of the robot to the array of detectors, Applicant submits that the rejection of claims 15 and 24 in view of *Ruffner* is rendered moot.

With respect to the rejection of over *Ruffner* in view of *Maimon*, Applicant respectfully submits that the combination of *Ruffner* and *Maimon* is an improper basis for an obviousness rejection over the present claims because *Maimon* expressly teaches away from both *Ruffner* and from amended independent claims 1, 8, 15, 24. See, M.P.E.P. § 2141.02.

*Ruffner* generally discloses a mobile appliance that includes an obstacle avoidance mechanism with detectors that capture reflections to determine objects in front of the mobile appliance. See, *Ruffner*, Abstract, column 12, lines 3-7. By mapping the delay of reflections, the mobile unit can obtain a snapshot of any objects in its path. See, *Ruffner*, column 12, lines 8-10.

*Maimon* generally discloses an active target distance measurement method that uses reflections of electromagnetic pulses. The technique of *Maimon* measures the energy of a reflected beam over a gaited interval to produce a gated energy. The gated energy is compared with a calibration energy to produce a ratio which is inversely proportional to the object distance. See, *Maimon*, column 1, lines 47-51. The active measurement technique of *Maimon* is designed to overcome the problems associated with active measurement methods similar to the method described in *Ruffner* and the method of amended independent claims 1, 8, 15, 24. In particular, *Maimon* discloses:

Active methods generally involve reflecting a beam from the object and measuring the time delay in the round trip. The distance may then be calculated using the identity

$$\text{Speed} = \text{distance} / \text{time}$$

In this case,

$$\text{Distance} = \text{beam speed} \times \text{measured delay} / 2$$

The measured delay is referred to hereinbelow as Time of Fly.

Other methods measure the phase of the transmitted pulse in order to determine the distance.

The time of fly method requires extremely high measurement accuracy and thus relatively complex electronics. It is thus impractical to produce time of fly based apparatus as an array to obtain spatial information from a plurality of points on an object. *Maimon*, column 1, lines 18-35.(emphasis added).

As described above, amended claims 1, 8, 15, and 24 each include storing data corresponding to at least one counter configured to determine a time value, an optic configured to focus a plurality of reflections of infrared light pulses from the environment of a robot to an array of detectors, and a processor operable to determine distance information based at least in part on the determined time value. In other words, amended claims 1, 8, 15 and 24 are each directed to an active measurement technique that determines a time value and uses the time value to determine distance, which is in direct contradiction to *Maimon's* teaching that such an active distance measurement technique requires "high measurement accuracy", "complex electronics" and is therefore "impractical." *Maimon*, column 1, lines 18-35. Thus, when considering the prior art and claimed invention as a whole, one of ordinary skill in the art seeking to modify or improve upon the teachings of *Maimon* would not arrive at amended claims 1, 8, 15, and 24.

Moreover, *Ruffner* appears to disclose an active measurement technique similar to the method that *Maimon* expressly disparages as "requiring high measurement accuracy", "complex electronics" and "impractical." *Ruffner*, as stated above, maps the delay of the of reflections to obtain snapshots of objects it approaches. That is, *Ruffner* actively measures a delay (i.e., time) of a reflection to determine the distance between the apparatus and an object. This is contrary to *Maimon's* teaching that measuring the time delay of a reflected pulse is undesirable. Thus, one of ordinary skill in the art would be lead away not just from the presently claimed combination, but also from the combination of *Maimon* with the apparatus of *Ruffner*. Applicant submits that the combination of *Maimon* and *Ruffner* is therefore an improper basis for supporting an

obviousness rejection over the amended claims. See, *In Re Icon Health and Fitness, Inc.* 496 F.3d. 1374, 1381 (Fed. Cir. 2007) (discussing that when a prior art reference expresses the undesirability of a combination, that combination is likely to be non-obvious); *KSR Int'l Co. v. Teleflex, Inc.*, 127 S. Ct. 1727, 1742 (2007) (explaining that a reference that teaches away from a claimed combination is more likely to make that claimed combination non-obvious); M.P.E.P. § 2141.02.

For at least these reasons, amended independent claims 1, 8, 15, and 24 and dependent claims 2 to 4, 6, 7, 9 to 11, 13, 14, 16 to 21, and 25 to 31 are patentably distinguished over *Ruffner* and *Maimon* individually and in combination.

The Office Action also rejection claims 5 and 12 under 35 U.S.C. §103(a) as being unpatentable over *Ruffner* and *Maimon* and further in view of *Jones*.

As described above, *Jones* does not disclose: (a) an array of detectors; and (b) an optic operatively coupled to the memory device and configured to focus a plurality of reflections of the infrared light pulses from the environment of the robot to the array of detectors. Accordingly, *Jones* does cure the deficiencies with respect to *Maimon* and *Ruffner*.

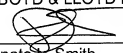
For at least this reason, claims 5 and 12 are patentably distinguished over *Ruffner*, *Maimon*, and *Jones*.

An earnest endeavor has been made to place this application in condition for formal allowance and is courteously solicited. If the Examiner has any questions regarding this Response, Applicant respectfully requests that the Examiner contact the undersigned.

Respectfully submitted,

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